JC08 Rec'd PCT/PTO 12 APR 2001

FORM PTO-1390 US DEPARTMENT OF COMMERCE
REV. 5-93PATENT AND TRADEMARK OFFICE

TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371

ATTORNEYS DOCKET NUMBER
P01,0137

U.S. APPLICATION NO. (if known, see 37 CFR 1.5)
09/807351

INTERNATIONAL APPLICATION NO.	INTERNATIONAL FILING DATE	PRIORITY DATE CLAIMED
PCT/DE99/03303	**14 OCTOBER 1999**	**14 OCTOBER 1998**

TITLE OF INVENTION

OPTICAL UNIDIRECTIONAL RING NETWORK

APPLICANT(S) FOR DO/EO/US

WILHELM-MARTIN PLOTZ ET AL.

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☒ This express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay.
4. ☒ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.

5. ☒ A copy of International Application as filed (35 U.S.C. 371(c)(2)) .
   a. ☒ is transmitted herewith (required only if not transmitted by the International Bureau).
   b. ☐ has been transmitted by the International Bureau.
   c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US)
6. ☒ A translation of the International Application into English (35 U.S.C. 371(c)(2).

7. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. §371(c)(3))
   a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
   b. ☐ have been transmitted by the International Bureau.
   c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
   d. ☒ have not been made and will not be made.

8. ☐ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).

9. ☒ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)) - **UNSIGNED.**

10. ☒ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11. to 16. below concern other document(s) or information included:

11. ☐ An Information Disclosure Statement under 37 C.F.R. 1.97 and 1.98; **(PTO 1449, Prior Art, Search Report, References).**

12. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 C.F.R. 3.28 and 3.31 is included. **(SEE ATTACHED ENVELOPE)**

13. ☒ Preliminary Amendment "A" Prior to Action and Appendix "A".
    ☐ A SECOND or SUBSEQUENT preliminary amendment.

14. ☒ A substitute specification and substitute specification mark-up.

15. ☐ A change of address letter attached to the Declaration.

16. ☒ Other items or information:
    a. ☒ Submission of Drawings and drawing changes
    b. ☒ Copy of International Search Report
    b. ☒ EXPRESS MAIL #EL 843728402 US dated April 12, 2001

U.S. APPLICATION NO. (if known, see 37 C.F.R. 1.5) 09/807351	INTERNATIONAL APPLICATION NO. PCT/DE99/03303	ATTORNEY'S DOCKET NUMBER P01,0137

17. ☒ The following fees are submitted:	CALCULATIONS	PTO USE ONLY
BASIC NATIONAL FEE (37 C.F.R. 1.492(a)(1)-(5): Search Report has been prepared by the EPO or JPO $860.00 International preliminary examination fee paid to USPTO (37 C.F.R. 1.482) $690.00 No international preliminary examination fee paid to USPTO (37 C.F.R. 1.482) but international search fee paid to USPTO (37 C.F.R. 1.445(a)(2) $710.00 Neither international preliminary examination fee (37 C.F.R. 1.482) nor international search fee (37 C.F.R. 1.445(a)(2) paid to USPTO $1000.00 International preliminary examination fee paid to USPTO (37 C.F.R. 1.482) and all claims satisfied provisions of PCT Article 33(2)-(4) $ 100.00		
ENTER APPROPRIATE BASIC FEE AMOUNT =	$ 860.00	
Surcharge of $130.00 for furnishing the oath or declaration later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 C.F.R. 1.492(e)).	$	

Claims	Number Filed		Number Extra	Rate		
Total Claims	07	- 20 =	0	X $ 18.00	$	
Independent Claims	02	- 3 =	0	X $ 80.00	$	
Multiple Dependent Claims				$270.00 +	$	
				TOTAL OF ABOVE CALCULATIONS =	$ 860.00	
Reduction by ½ for filing by small entity, if applicable. Verified Small Entity statement must also be filed. (Note 37 C.F.R. 1.9, 1.27, 1.28)					$	
				SUBTOTAL =	$ 860.00	
Processing fee of $130.00 for furnishing the English translation later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492(f)). +					$	
				TOTAL NATIONAL FEE =	$ 860.00	
Fee for recording the enclosed assignment (37 C.F.R. 1.21(h). The assignment must be accompanied by an appropriate cover sheet (37 C.F.R. 3.28, 3.31). $40.00 per property +						
				TOTAL FEES ENCLOSED =	$ 860.00	
				Amount to be refunded	$	
				charged	$	

a. ☒ A check in the amount of $ 860.00 to cover the above fees is enclosed.

b. ☐ Please charge my Deposit Account No. _____ in the amount of $ _____ to cover the above fees. A duplicate copy of this sheet is enclosed.

c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. **50-1519**. **A duplicate copy of this sheet is enclosed.**

NOTE: Where an appropriate time limit under 37 C.F.R. 1.494 or 1.495 has not been met, a petition to revive (37 C.F.R. 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

SCHIFF HARDIN & WAITE
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6600 Sears Tower
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CUSTOMER NUMBER 26574

Mark Bergner
SIGNATURE

Mark Bergner
NAME

45,877
Registration Number

BOX PCT
IN THE UNITED STATES DESIGNATED/ELECTED OFFICE
OF THE UNITED STATES PATENT AND TRADEMARK OFFICE
UNDER THE PATENT COOPERATION TREATY--CHAPTER II

PRELIMINARY AMENDMENT A
PRIOR TO ACTION

APPLICANT(S):	Wilhelm-Martin PLOTZ et al.
ATTORNEY DOCKET NO.:	P01,0137
INTERNATIONAL APPLICATION NO:	PCT/DE99/03303
INTERNATIONAL FILING DATE:	14 October 1999
INVENTION:	**OPTICAL UNIDIRECTIONAL RING NETWORK**

Assistant Commissioner for Patents,
Washington D.C. 20231

Sir:

Applicants herewith amend the above-referenced PCT application, and request entry of the Amendment prior to examination on the United States Examination Phase.

IN THE CLAIMS:

On substitute page 6:

replace line 1 with --WHAT IS CLAIMED IS:--;

Please replace original claims 1-7 with the following rewritten claims 1-7, referring to the mark-ups in Appendix A.

1. (Amended) An add-drop arrangement for a unidirectional optical ring network for launching and outputting optical signals, comprising:

a grating filter, designed as a bandstop filter, for said optical ring network for outputting optical signals;

a first coupler having one input, to which incoming signals are fed, and two outputs which are a first output and a second output; and

a second optical coupler that is connected to said first output, said second optical coupler being designed as a grating filter with bandstop properties, the

grating filter being tuned to a wavelength of a signal to be launched, such that said signal is reflected as a reflected signal, and incoming signals having all other wavelengths are passed at, and output at, an output, said second optical coupler having an add input into which said signal to be launched is fed against its transmission direction, reflected, and added to said passed signals;

said second output of said first coupler being connected to a further optical filter via which an incoming optical signal is output.

2. (Amended) The add-drop arrangement as claimed in claim 1, wherein said further optical filter of said add-drop arrangement is configured to output different transmission channels.

3. (Amended) The add-drop arrangement as claimed in claim 2, further comprising:

further filters which can be exchanged or switched over; and

exchangeable second optical couplers with grating filters tuned to other wavelengths.

4. (Amended) The optical ring network as claimed in claim 3, wherein said add-drop arrangement has exchangeable second optical couplers which are tuned to other wavelengths.

5. (Amended) The optical ring network as claimed in claim 2, wherein said second optical coupler has a further connection via which said reflected signals are led to an optical sink.

6. (Amended) An optical unidirectional ring network, comprising:

a plurality of network nodes, in which data signals are transmitted in wavelength-division multiplex operation via an optical fiber and every network node

is assigned for its data signal to be emitted an assigned transmission channel with a transmission band used only once; and

at least one network node having an add-drop arrangement as claimed in claim 1.

7. (Amended) The optical ring network as claimed in claim 6, further comprising a further fiber provided for protection purposes.

REMARKS

The present Amendment revises the specification and claims to conform to United States patent practice, before examination of the present PCT application in the United States National Examination Phase. Pursuant to 37 CFR 1.125 (b), applicants have concurrently submitted a substitute specification, excluding the claims, and provided a marked-up copy. All of the changes are editorial and applicant believes no new matter is added thereby. The amendment, addition, and/or cancellation of claims is not intended to be a surrender of any of the subject matter of those claims.

Early examination on the merits is respectfully requested.

Submitted by,

Mark Bergner (Reg. No. 45,877)

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Appendix A
Mark Ups for Claim Amendments

This redlined draft, generated by CompareRite (TM) - The Instant Redliner, shows the differences between -
original document : Q:\DOCUMENTS\YEAR 2001\P010137-MARTIN-OPTICAL RING NETWORK\ORIGINAL CLAIMS.DOC
and revised document: Q:\DOCUMENTS\YEAR 2001\P010137-MARTIN-OPTICAL RING NETWORK\AMENDED CLAIMS.DOC

CompareRite found 76 change(s) in the text

Deletions appear as Overstrike text surrounded by []
Additions appear as Bold-Underline text

1. **(Amended)** An add-drop arrangement ~~[(51, 54, 61)]~~ for a unidirectional optical ring network for launching and outputting optical signals, ~~[having]~~ **comprising:**

a grating filter~~[(62)]~~, designed as a bandstop filter, for ~~[an]~~ **said** optical ring network for outputting optical signals~~[(B - N), characterized in that the];~~

a first coupler ~~[(51) has]~~ **having** one input, to which ~~[the]~~ incoming signals ~~[(B - N)]~~ are fed, and two outputs~~[, in that the]~~ **which are a** first output ~~[is connected to]~~ **and a second output; and**

a second optical coupler ~~[(61), which is]~~**that is connected to said first output, said second optical coupler being** designed as **a** grating filter ~~[(62)]~~ with bandstop properties, the grating filter ~~[(62)]~~ being tuned to ~~[the]~~ **a** wavelength of a signal ~~[(A,ADD)]~~ to be launched, such that ~~[this]~~ **said** signal is reflected **as a reflected signal**, and incoming signals ~~[(B - N)]~~ having all other wavelengths are passed at, and output at, an output~~[(3), in that the]~~, **said** second **optical** coupler ~~[(61) has]~~ **having** an add input ~~[(8)]~~ into which ~~[the]~~ **said** signal ~~[(A,ADD)]~~ to be launched is fed against its transmission direction, reflected, and added to ~~[the]~~ **said** passed signals~~[(B - N), and in that a];~~

said second output of ~~[the]~~ **said** first coupler ~~[(51) is]~~ **being** connected to a further optical filter ~~[(52, 54)]~~ via which an incoming optical signal ~~[(DROP; B,DROP)]~~ is output.

2. **(Amended)** The add-drop arrangement as claimed in claim 1, ~~[characterized in that the]~~ **wherein said** further optical filter ~~[(52, 54)]~~ of ~~[the]~~ **said** add-drop arrangement ~~[(51, 54, 61) is designed in such a way that]~~ **is configured to output** different transmission channels~~[(DROP; B,DROP) are output.]~~.

~~[3.]~~**3. (Amended)** The add-drop arrangement as claimed in claim 2, ~~[characterized in that]~~ **further comprising:**

~~[the add-drop arrangement (51, 54, 61) has further]~~**further** filters ~~[(52)]~~ which can be exchanged or switched over~~[,]~~; and

[has] exchangeable second **optical** couplers [(61)] with grating filters [(62)] tuned to other wavelengths.

4. **(Amended)** The optical ring network as claimed in claim 3, [characterized in that the] **wherein said** add-drop arrangement [(51, 54, 61)] has exchangeable second **optical** couplers [(61)] which are tuned to other wavelengths.

5. **(Amended)** The optical ring network as claimed in claim 2, [characterized in that the] **wherein said** second **optical** coupler [(61)] has a further connection via which [the] **said** reflected signals are led to an optical sink[(63)].

6. **(Amended)** An optical unidirectional ring network [having]**, comprising:**

a plurality of network nodes[(NA - NN)], in which data signals [(A, B, ...N)] are transmitted in wavelength-division multiplex operation via an optical fiber [(1)] and every network node [(NA - NN)] is assigned for its data signal [(A,ADD)] to be emitted an assigned transmission channel [(A)] with a transmission band used only once[, characterized in that]**; and**

at least one network node [(NA - NN) has] **having** an add-drop arrangement [(51, 54, 61)] as claimed in [one of the preceding claims.] **claim 1.**

[7.]**7. (Amended)** The optical ring network as claimed in claim 6, [characterized in that] **further comprising** a further fiber [(P1) is] provided for protection purposes.

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IN THE UNITED STATES DESIGNATED/ELECTED OFFICE
OF THE UNITED STATES PATENT AND TRADEMARK OFFICE
UNDER THE PATENT COOPERATION TREATY--CHAPTER II

REQUEST FOR APPROVAL OF DRAWING CHANGES

APPLICANT(S):	Wilhelm-Martin PLOTZ et al.
ATTORNEY DOCKET NO.:	P01,0137
INTERNATIONAL APPLICATION NO:	PCT/DE99/03303
INTERNATIONAL FILING DATE:	14 October 1999
INVENTION:	OPTICAL UNIDIRECTIONAL RING NETWORK

Assistant Commissioner for Patents,
Washington, D.C. 20231

Sir:

Enclosed are two sheets of drawings showing in red, changes to Figures 1 through 4. Approval of the changes is respectfully requested.

Submitted by,

Mark Bergner (Reg. No. 45,877)

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FIG 1

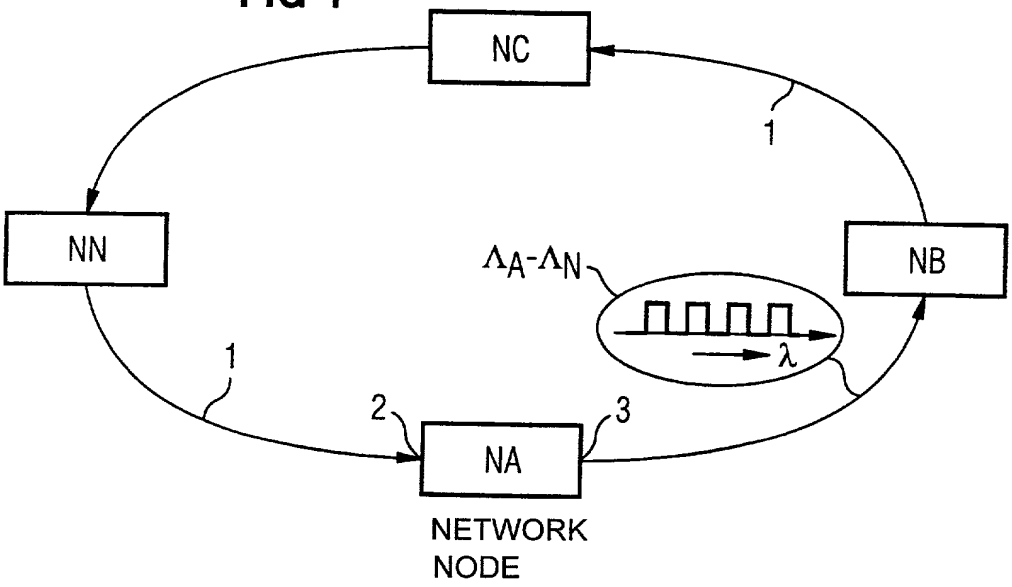

NC
1
NN
NB
Λ_A-Λ_N
λ
1
2
3
NA
NETWORK NODE

FIG 2

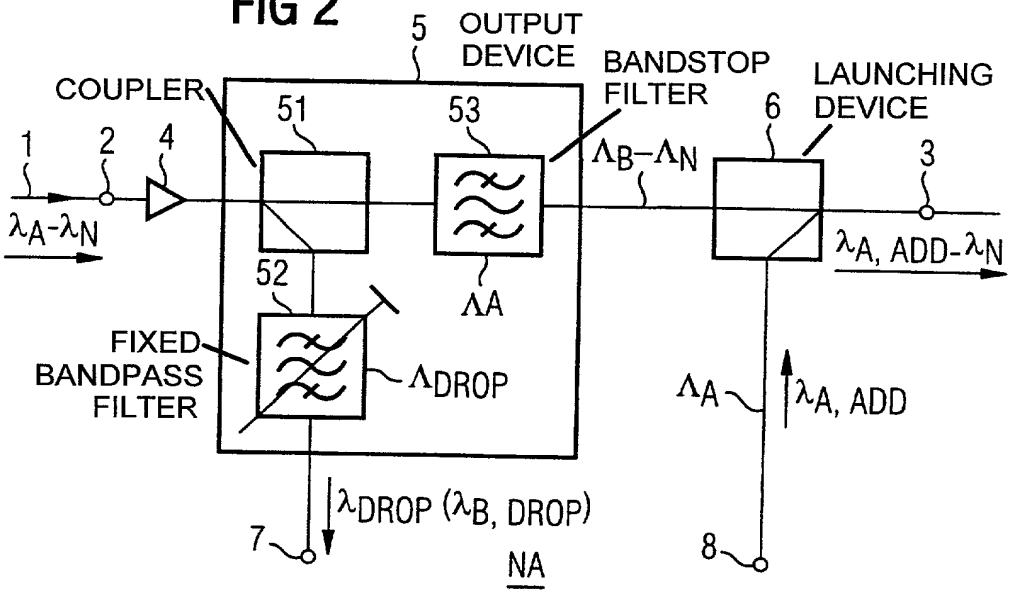

5
OUTPUT DEVICE
BANDSTOP FILTER
LAUNCHING DEVICE
COUPLER
51
53
6
1
2
4
Λ_B–Λ_N
3
λ_A-λ_N
λ_A, ADD-λ_N
52
Λ_A
FIXED BANDPASS FILTER
Λ_{DROP}
Λ_A
λ_A, ADD
λ_{DROP} (λ_B, DROP)
7
8
NA

FIG 3

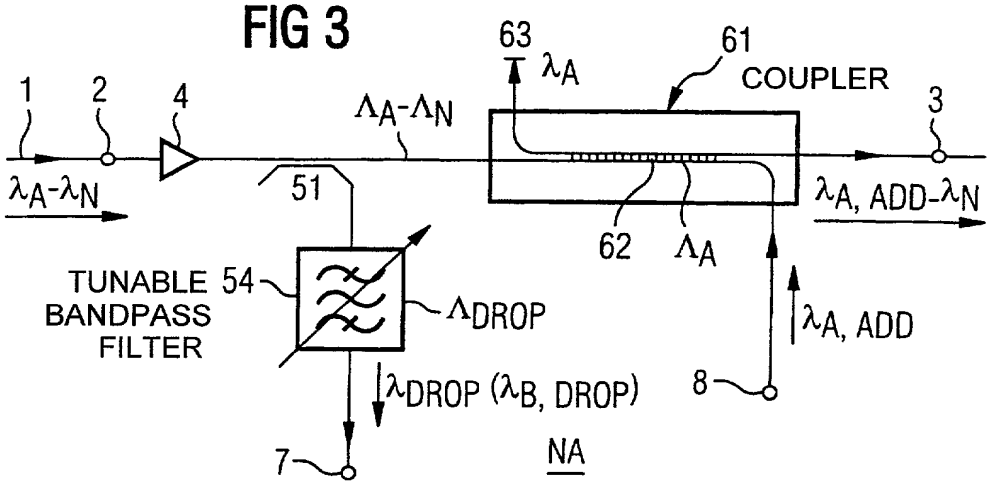
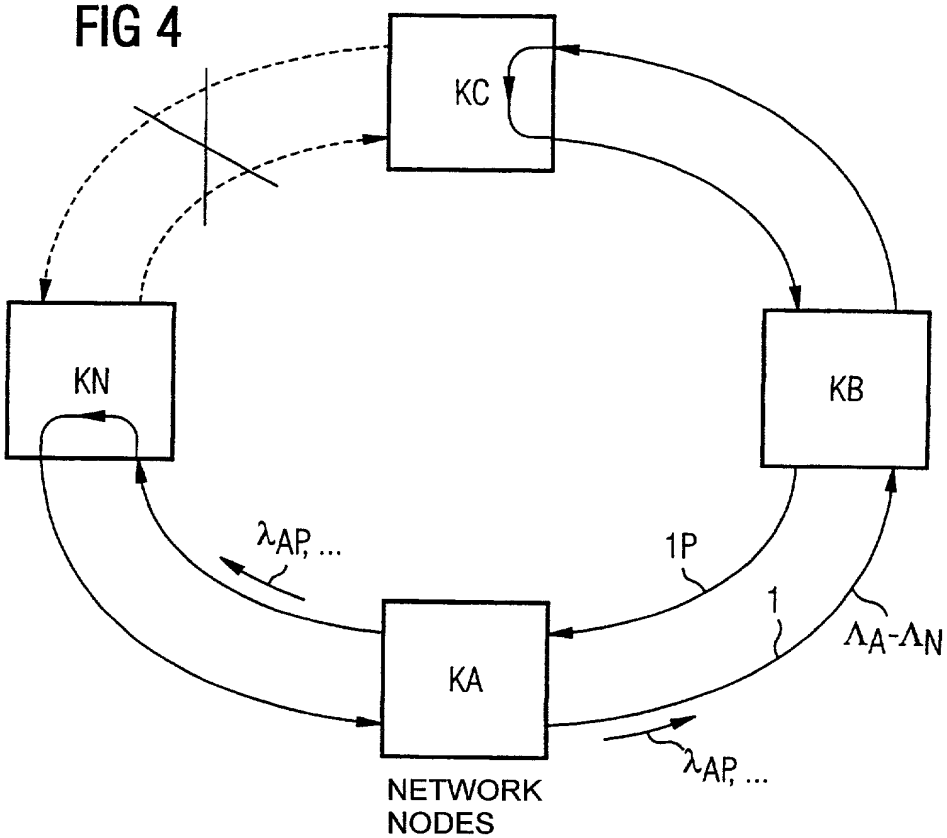

63
λ_A
61
COUPLER
1
2
4
Λ_A-Λ_N
3
λ_A-λ_N
51
λ_A, ADD-λ_N
62
Λ_A
TUNABLE BANDPASS FILTER
54
Λ_{DROP}
λ_A, ADD
8
λ_{DROP} ($\lambda_{B, DROP}$)
7
NA

FIG 4


KC
KN
KB
λ_{AP}, ...
1P
1
Λ_A-Λ_N
KA
λ_{AP}, ...
NETWORK NODES

SPECIFICATION

TITLE

OPTICAL UNIDIRECTIONAL RING NETWORK

BACKGROUND OF THE INVENTION

Field of the Invention

[0001] The invention relates to an optical unidirectional ring network for launching and outputting optical signals.

Description of the Related Art

[0002] Ring networks are known for the purpose of transmitting large data volumes in which data are transmitted between different network nodes/terminals in a unidirectional or - mostly via two fibers - bidirectional fashion.

[0003] A colored section ring is known from the "22nd European Conference on Optical Communication" - ECOC 96, Oslo, pages 3.51 to 3.54 in which a wavelength used only once is used in each case for transmission between two network nodes. As a result, it is possible in the event of interference to switch a standby connection with the same wavelength via the undisturbed part of the ring network.

[0004] Numerous variants for add-drop modules with couplers and filters are specified in IEEE Photonics Technology Letters 6(1994), No. 6, New York, pages 760 to 763, "Optically-Amplified WDM Ring Network Incorporating Channel-Dropping Filters". Conventional filters are used for outputting and launching signals.

[0005] Add-drop modules which essentially have two couplers and a reflection filter are disclosed in Electronics Letters 16 March 1995, Vol. 31, No. 6 pages 476 and 477. These add-drop modules are suitable only for specific networks, since signals of identical wavelengths are launched and output.

[0006] In "Optical Fiber Communication Conference" 1992, San Jose 2-7, Optical Society of America, US, Washington DC 2006, pages 255-256, and Figure 2, there is a description of an add-drop module having a plurality of conventional drop

filters and add filters. A protection connection is set up in the usual way by feeding back the data.

[0007] A protection method is disclosed in Electronics Letters, GB, IEE Stevenage, Vol. 32, no. 3,1, February 1996, pages 234-235, "Increased Capacity in an MS Protection Ring Using WDM Technique and OADM: The Coloured Section Ring" in which different wavelengths are used for individual link sections of a bidirectional ring network. A protection connection is made via a wavelength not used on the undisturbed sections.

[0008] Wavelength changes are required as a rule in order to reconfigure a ring network, i.e., to set up new logic connections. The aim with newly designed optical ring networks is for data to be dropped and inserted on the optical plane, and to permit simple reconfiguration. Moreover, it is also possible to implement the ring network including the add-drop modules (network nodes) as cost effectively as possible.

SUMMARY OF THE INVENTION

[0009] The invention provides an add-drop arrangement for a unidirectional optical ring network for launching and outputting optical signals, comprising a grating filter, designed as a bandstop filter, for said optical ring network for outputting optical signals; a first coupler having one input, to which incoming signals are fed, and two outputs which are a first output and a second output; and a second optical coupler that is connected to said first output, said second optical coupler being designed as a grating filter with bandstop properties, the grating filter being tuned to a wavelength of a signal to be launched, such that said signal is reflected as a reflected signal, and incoming signals having all other wavelengths are passed at, and output at, an output, said second optical coupler having an add input into which said signal to be launched is fed against its transmission direction, reflected, and added to said passed signals; said second output of said first coupler being connected to a further optical filter via which an incoming optical signal is output. The further optical filter of the add-drop arrangement may be configured to output different transmission channels. The inventive add-drop arrangement may further comprise further filters which can be exchanged or switched over; and

exchangeable second optical couplers with grating filters tuned to other wavelengths. The add-drop arrangement may have exchangeable second optical couplers which are tuned to other wavelengths, and/or the second optical couplers may have a further connection via which said reflected signals are led to an optical sink.

[0010] An inventive optical unidirectional ring network comprising a plurality of network nodes, in which data signals are transmitted in wavelength-division multiplex operation via an optical fiber and every network node is assigned for its data signal to be emitted an assigned transmission channel with a transmission band used only once, can utilize at least one network node having an above-described inventive add-drop arrangement. This network may further comprise a further fiber provided for protection purposes.

[0011] A unidirectional ring network is particularly cost effective, since only one glass fiber is required for transmission, and the network nodes can be of simple design. A unique assignment of transmission channels, and thus of the transmitted data signals to the network nodes is provided by the fixed assignment of a specific transmission channel or a wavelength, which is used only once in the ring network, to a network node. Since each network node receives the data signals of all other network nodes, the setting up of an arbitrary connection to other network nodes is possible by selecting an appropriate receiving filter. If a receiving filter which can be switched over or tuned is selected, any desired connections can be set up between all the network nodes. A plurality of filters also permits simultaneous connection to a plurality of network nodes.

[0012] A very simple design of an add-drop module or a network node results from the use of a coupler which is provided with a grating and thereby has filtering properties. If higher demands are placed on the transmission integrity, it is possible to provide for backup circuits a second ring in which the data transmission is performed in the opposite direction.

BRIEF DESCRIPTION OF THE DRAWINGS

[0013] Exemplary embodiments of the invention are explained in more detail with the aid of figures.

[0014] Figure 1 is a schematic block diagram showing a unidirectional ring network;

[0015] Figure 2 is a schematic block diagram showing an obvious exemplary embodiment of a network node;

[0016] Figure 3 is a schematic block diagram showing an exemplary embodiment according to the invention of this network node; and

[0017] Figure 4 is a schematic block diagram showing a unidirectional ring network having a standby transmission ring.

DETAILED DESCRIPTION OF THE INVENTION

[0018] A unidirectional ring network having a plurality of network nodes NA, NB, NC, ..., NN is illustrated in Figure 1. The transmission between arbitrary network nodes is performed using wavelength-division multiplex operation via a glass fiber 1 in a plurality of transmission channels ΛA to ΛN, which have a prescribed wavelength spacing from one another. The transmission direction is marked by arrows.

[0019] The network node NA is illustrated as a block diagram in Figure 2 in a standard implementation. Network nodes serve the purpose of implementing different connections, which are always performed via transmission channels. Data signals that are output in the network node are denoted as drop signals (drop), and those that are emitted being denoted as add data signals (add). Dropping, switching through or adding channels are also considered, the signals transmitted in these channels being intended, in the narrower sense. Reference symbols with identical indices are used for the transmission channels and the associated data signals. A data signal λA is transmitted in the associated transmission channel ΛA.

[0020] The network node reduced to the essential functions of an add-drop module contains the series circuit of an amplifier 4, an output device 5 and a launching device 6. A wavelength-division multiplex signal of all the data signals λA - λN received via transmission channels ΛA - ΛN is present at the input 2. A single signal can be transmitted in each transmission channel (transmission band), or else

a plurality of individual signals can be transmitted using wavelength-division (or time-division) multiplex operation.

[0021] The received signals are initially amplified and then passed to the output device 5. There, all the data signals/transmission channels are then split up into two signal paths in a 1:2 coupler (branching device). All the transmission signals/transmission channels to be switched through, except for the transmission channel ΛA assigned to this network node, are switched through via a signal path; a transmission channel ΛDROP or its data signal λDROP, for example, the data signal λB,DROP, is output via the other signal path.

[0022] The transmission channel ΛDROP to be dropped is selected by the output device, designed here as a wavelength filter. The wavelength filter is illustrated here schematically as a coupler 51 with a fixed bandpass filter 52, that can be switched over or tuned, and a bandstop filter 53. The channel λDROP is the only one in the passband of the bandpass filter 52. It is relayed to a user terminal, for example, via a drop output 7.

[0023] Instead of the dropped data signal/channel, an appropriate data signal λA,ADD present at the add input 8 in the assigned transmission channel is added in this network node in the launching device 6, designed as coupler. This presupposes that the signal λA (loop return signal) already emitted from the network node A and received again via the ring at the input 2 must be blocked at the latest upstream of the launching device 6. The bandstop filter 53 is provided for this purpose, which is situated in the first signal path and permanently tuned to the corresponding wavelength. The transmission of this signal can certainly also already be interrupted in the preceding network node MN, but this entails an additional outlay on configuration given additional further network nodes.

[0024] A wavelength-division multiplex signal containing the signals of all the transmission channels λA,ADD and λB to λN is emitted at the output 3.

[0025] Each network node can receive the corresponding transmitted signal of each other network node, that is to say, an appropriate connection can be set up in each case by exchanging, switching over or tuning the band pass filter 52. This makes it possible to change the configuration in a simple way.

[0026] A network node according to the invention is illustrated in Figure 3. In this exemplary embodiment, a tunable bandpass filter 54 is provided, and a coupler 61 provided with a grating 62 serves as launching device 61, 62. The wavelength-division multiplex signal coming from the amplifier 4 also contains the data signal λA, which has already transversed the entire ring network (loop return signal). The latter is reflected by the grating 62, which acts as a bandstop filter, and destroyed in an optical sink 63 (a suitable optical fiber termination). The signal λA,ADD initially fed into the coupler contrary to the direction of transmission of the ring network is likewise reflected by the grating and thereby sent onwards in the transmission direction. Various structures are known for the coupler 61 provided with the grating. Either the grating is arranged in the coupling region (Figure 3), or two coupling regions are implemented between which separate gratings are respectively provided for each fiber.

[0027] Of course, it is also possible to implement connections to a plurality of channels between the individual network nodes. The add-drop modules illustrated in Figures 2 and 3 can be connected in series or appropriately adapted for this purpose. The joint outputting and launching of a plurality of adjacent channels is also possible for the use of wider filters.

[0028] Figure 4 shows an expanded ring network in which the optical fiber 1 is supplemented by an optical fiber 1P provided for protection purposes. In the event of a breakage or some other disturbance affecting the optical fiber 1, the data signals - only the protection data signal λAP being illustrated - are first transmitted via the undisturbed portion of the ring network and then fed in the opposite direction into the protection optical fiber 1P so that all the network nodes KA, KB, KC, KN receive the data signal. The selection of the transmission path is performed by changeover switches provided in the network nodes.

[0029] The above-described add-drop arrangement and optical ring network are illustrative of the principles of the present invention. Numerous modifications and adaptations will be readily apparent to those skilled in this art without departing from the spirit and scope of the present invention.

ABSTRACT

[0030] An optical unidirectional ring network having a plurality of network nodes (NA, NB, ...), in which each network node is assigned a transmission channel (ΛA) with a transmission band occurring only once. The network is configured using receiving filters (54) which can be switched over or tuned.

This redlined draft, generated by CompareRite (TM) - The Instant Redliner, shows the differences between -

original document : Q:\DOCUMENTS\YEAR 2001\P010137-MARTIN-OPTICAL RING NETWORK\ORIGINAL SPECIFICATION.DOC

and revised document: Q:\DOCUMENTS\YEAR 2001\P010137-MARTIN-OPTICAL RING NETWORK\SUBSTITUTE SPECIFICATION.DOC

CompareRite found 71 change(s) in the text

Deletions appear as Overstrike text surrounded by []

Additions appear as Bold-Underline text

[~~Description~~] **SPECIFICATION**

[~~Optical unidirectional ring network~~] **TITLE**

OPTICAL UNIDIRECTIONAL RING NETWORK

BACKGROUND OF THE INVENTION

Field of the Invention

[0001] The invention relates to an optical unidirectional ring network [~~according to the preamble of patent claim 1.~~] **for launching and outputting optical signals.**

[~~Known~~] **Description of the Related Art**

[0002] **Ring networks are known** for the purpose of transmitting large data volumes [~~are ring networks~~] in which data are transmitted between different network nodes/terminals in a unidirectional or - mostly via two fibers - bidirectional fashion.

[~~Known~~]**[0003]** **A colored section ring is known** from the "22nd European Conference on Optical Communication" - ECOC 96, Oslo, pages 3.51 to 3.54 [~~is a colored section ring~~] in which a wavelength used only once is used in each case for transmission between two network nodes. As a result, it is possible in the event of interference to switch a standby connection with the same wavelength via the undisturbed part of the ring network.

[~~The plurality of~~]**[0004]** **Numerous** variants for add-drop modules with couplers and filters are specified in IEEE Photonics Technology Letters 6(1994), No. 6, New

York, pages 760 to 763, "Optically-Amplified WDM Ring Network Incorporating Channel-Dropping Filters". Conventional filters are used for outputting and launching signals.

[0005] Add-drop modules which essentially have two couplers and a reflection filter are ~~[to be gathered from]~~ **disclosed in** Electronics Letters 16 March 1995, Vol. 31, No. 6 pages 476 and 477. These add-drop modules are suitable only for specific networks, since signals of identical wavelengths are launched and output.

[0006] In ~~[Figure 2 in]~~"Optical Fiber Communication Conference" 1992, San Jose 2-7, Optical Society of America, US, Washington DC 2006, pages 255-256, **and Figure 2,** there is a description of an add-drop module having a plurality of conventional drop filters and add filters. A protection connection is set up in the usual way by feeding back the data.

~~[Disclosed]~~**[0007]** **A protection method is disclosed** in Electronics Letters, GB, IEE Stevenage, Vol. 32, no. 3,1, February 1996, pages 234-235, "Increased Capacity in an MS Protection Ring Using WDM Technique and OADM: The Coloured Section Ring" ~~[is a protection method]~~ in which different wavelengths are used for individual link sections of a bidirectional ring network. A protection connection is made via a wavelength not used on the undisturbed sections.

[0008] Wavelength changes are required as a rule in order to reconfigure a ring network, ~~[that is to say]~~ **i.e.,** to set up new logic connections. The aim with newly designed optical ring networks is for data to be dropped and inserted on the optical plane, and ~~[for reconfiguration to be a]~~ **to permit** simple ~~[possibility]~~ **reconfiguration**. Moreover, it is also possible to implement the ring network including the add-drop modules (network nodes) as cost effectively as possible.

SUMMARY OF THE INVENTION

[0009] **The invention provides** ~~[Such]~~ an add-drop **arrangement for a unidirectional optical ring network for launching and outputting optical signals, comprising a grating filter, designed as a bandstop filter, for said optical ring network for outputting optical signals; a first coupler having one input, to which incoming signals are fed, and two outputs which are a first output and a second output; and a second optical coupler that is connected to said first output, said second optical coupler being designed as a grating filter**

with bandstop properties, the grating filter being tuned to a wavelength of a signal to be launched, such that said signal is reflected as a reflected signal, and incoming signals having all other wavelengths are passed at, and output at, an output, said second optical coupler having an add input into which said signal to be launched is fed against its transmission direction, reflected, and added to said passed signals; said second output of said first coupler being connected to a further optical filter via which an incoming optical signal is output. The further optical filter ~~[module is specified in claim 1. Advantageous developments]~~ of the add-drop ~~[module ring network are specified in the subclaims. A ring network implemented thereby is specified in claim 6.~~ **]arrangement may be configured to output different transmission channels. The inventive add-drop arrangement may further comprise further filters which can be exchanged or switched over; and exchangeable second optical couplers with grating filters tuned to other wavelengths. The add-drop arrangement may have exchangeable second optical couplers which are tuned to other wavelengths, and/or the second optical couplers may have a further connection via which said reflected signals are led to an optical sink.**

[0010] An inventive optical unidirectional ring network comprising a plurality of network nodes, in which data signals are transmitted in wavelength-division multiplex operation via an optical fiber and every network node is assigned for its data signal to be emitted an assigned transmission channel with a transmission band used only once, can utilize at least one network node having an above-described inventive add-drop arrangement. This network may further comprise a further fiber provided for protection purposes.

[0011] A unidirectional ring network is particularly cost effective, since only one glass fiber is required for transmission, and the network nodes can be of simple design. A unique assignment of transmission channels, and thus of the transmitted data signals to the network nodes is provided by the fixed assignment of a specific transmission channel or a wavelength, which is used only once in the ring network, to a network node. Since each network node receives the data signals of all other network nodes, the setting up of an arbitrary connection to other network nodes is possible by selecting an appropriate receiving filter. If a receiving filter which can be

switched over or tuned is selected, any desired connections can be set up between all the network nodes. A plurality of filters also permits simultaneous connection to a plurality of network nodes.

[0012] A very simple design of an add-drop module or a network node results from the use of a coupler which is provided with a grating and thereby has filtering properties. [

]If higher demands are placed on the transmission integrity, it is possible to provide for backup circuits a second ring in which the data transmission is performed in the opposite direction.

BRIEF DESCRIPTION OF THE DRAWINGS

[0013] Exemplary embodiments of the invention are explained in more detail with the aid of figures[, in which:

].

[0014] Figure 1 [shows an] **is a schematic block diagram showing a** unidirectional ring network[,

];

[0015] Figure 2 [shows a]**is a schematic block diagram showing an** obvious exemplary embodiment of a network node[,

];

[0016] Figure 3 [shows] **is a schematic block diagram showing** an exemplary embodiment according to the invention of this network node[,]; and

[0017] Figure 4 [shows] **is a schematic block diagram showing** a unidirectional ring network having a standby transmission ring.

DETAILED DESCRIPTION OF THE INVENTION

[0018] A unidirectional ring network having a plurality of network nodes NA, NB, NC, ..., NN is illustrated in Figure 1. The transmission between arbitrary network nodes is performed using wavelength-division multiplex operation via a glass fiber 1 in a plurality of transmission channels ΛA to ΛN, which have a prescribed

wavelength spacing from one another. The transmission direction is marked by arrows.

[0019] The network node NA is illustrated as a block diagram in Figure 2 in ~~[an obvious]~~ **a standard** implementation. Network nodes serve the purpose of implementing different connections, which are always performed via transmission channels. Data signals ~~[to be]~~ **that are** output in the network node are denoted as drop signals (drop), **and** those ~~[to be]~~ **that are** emitted being denoted as add data signals (add). Dropping, switching through or adding channels are also ~~[spoken of]~~ **considered**, the signals transmitted in these channels being intended, in the narrower sense. Reference symbols with identical indices are used for the transmission channels and the associated data signals. A data signal λA is transmitted in the associated transmission channel Λ~~[B]~~ **A**.

[0020] The network node reduced to the essential functions of an add-drop module contains the series circuit of an amplifier 4, an output device 5 and a launching device 6. A wavelength-division multiplex signal of all the data signals λA - λN received via transmission channels ΛA - ΛN is present at the input 2. A single signal can be transmitted in each transmission channel (transmission band), or else a plurality of individual signals can be transmitted using wavelength-division ~~[multiplex operation or, of course, also using time-division]~~**(or time-division)** multiplex operation.

[0021] The received signals are ~~[firstly]~~ **initially** amplified and then passed to the output device 5. There, all the data signals/transmission channels are ~~[firstly]~~ **then** split up into two signal paths in a 1:2 coupler (branching device). All the transmission signals/transmission channels to be switched through, except for the transmission channel ΛA assigned to this network node, are switched through via a signal path; a transmission channel $\Lambda DROP$ or ~~[the]~~ **its** data signal $\lambda DROP$ ~~[thereof]~~, for example, the data signal $\lambda B,DROP$, is output via the other signal path.

[0022] The transmission channel $\Lambda DROP$ to be dropped is selected by the output device, designed here as a wavelength filter. The wavelength filter is illustrated here schematically as a coupler 51 with a fixed bandpass filter 52, ~~[which]~~ **that** can be switched over or tuned, and a bandstop filter 53. The channel $\lambda DROP$ is the only one in the passband of the bandpass filter 52. It is relayed to a user

terminal, for example, via a drop output 7.

[0023] Instead of the dropped data signal/channel, an appropriate data signal λA,ADD present at the add input 8 in the assigned transmission channel is added in this network node in the launching device 6, designed as coupler. This presupposes that the signal λA (loop return signal) already emitted from the network node A and received again via the ring at the input 2 must be blocked at the latest upstream of the launching device 6. ~~[Provided]~~ **The bandstop filter 53 is provided** for this purpose ~~[is the bandstop filter 53]~~, which is situated in the first signal path and permanently tuned to the corresponding wavelength. The transmission of this signal can certainly also already be interrupted in the preceding network node MN, but this entails an additional outlay on configuration given additional further network nodes.

[0024] A wavelength-division multiplex signal containing the signals of all the transmission channels λA,ADD and λB to λN is emitted at the output 3.

[0025] Each network node can receive the corresponding transmitted signal of each other network node, that is to say, an appropriate connection can be set up~~[,]~~ in each case by exchanging, switching over or tuning the band pass filter 52. ~~[It is thereby]~~ **This makes it** possible to change the configuration in a simple way.

[0026] A network node according to the invention is illustrated in Figure 3. In this exemplary embodiment, a tunable bandpass filter 54 **is** provided, and a coupler 61 provided with a grating 62 serves as launching device 61, 62. The wavelength-division multiplex signal coming from the amplifier 4 also contains the data signal λA, which has already transversed the entire ring network (loop return signal). The latter is reflected by the grating 62, which acts as a bandstop filter, and destroyed in an optical sink 63 (a suitable optical fiber termination). The signal λA,ADD initially fed into the coupler contrary to the direction of transmission of the ring network is likewise reflected by the grating and thereby sent onwards in the transmission direction. Various structures are known for the coupler 61 provided with the grating. Either the grating is arranged in the coupling region (Figure 3), or two coupling regions are implemented between which separate gratings are respectively provided for each fiber.

[0027] Of course, it is also possible to implement connections to a plurality of channels between the individual network nodes. The add-drop modules illustrated in

Figures 2 and 3 can be connected in series or appropriately adapted for this purpose. The joint outputting and launching of a plurality of adjacent channels is also possible for the use of wider filters.

[0028] Figure 4 shows an expanded ring network in which the optical fiber 1 is supplemented by an optical fiber 1P provided for protection purposes. In the event of a breakage or some other disturbance affecting the optical fiber 1, the data signals - only the protection data signal λAP being illustrated - are ~~[firstly]~~ **first** transmitted via the undisturbed portion of the ring network and then fed in the opposite direction into the protection optical fiber 1P~~[,]~~ so that all the network nodes **KA, KB, KC, KN** receive the data signal. The selection of the transmission path is performed by changeover switches provided in the network ~~[nodes.Abstract]~~ **nodes.**

~~[Optical unidirectional]~~**[0029]** **The above-described add-drop arrangement and optical** ring network **are illustrative of the principles of the present invention. Numerous modifications and adaptations will be readily apparent to those skilled in this art without departing from the spirit and scope of the present invention.**

ABSTRACT

[0030] **An optical** ~~[Optical]~~ unidirectional ring network having a plurality of network nodes (NA, NB, ...), in which each network node is assigned a transmission channel (ΛA) with a transmission band occurring only once. The network is configured using receiving filters (54) which can be switched over or tuned.

~~[Figure 3]~~

Description

Optical unidirectional ring network

The invention relates to an optical unidirectional ring network according to the preamble of patent claim 1.

Known for the purpose of transmitting large data volumes are ring networks in which data are transmitted between different network nodes/terminals in a unidirectional or - mostly via two fibers - bidirectional fashion.

Known from the "22nd European Conference on Optical Communication" - ECOC 96, Oslo, pages 3.51 to 3.54 is a colored section ring in which a wavelength used only once is used in each case for transmission between two network nodes. As a result, it is possible in the event of interference to switch a standby connection with the same wavelength via the undisturbed part of the ring network.

The plurality of variants for add-drop modules with couplers and filters are specified in IEEE Photonics Technology Letters 6(1994), No. 6, New York, pages 760 to 763, "Optically-Amplified WDM Ring Network Incorporating Channel-Dropping Filters". Conventional filters are used for outputting and launching signals.

Add-drop modules which essentially have two couplers and a reflection filter are to be gathered from Electronics Letters 16 March 1995, Vol. 31, No. 6 pages 476 and 477. These add-drop modules are suitable only for specific networks, since signals of identical wavelengths are launched and output.

In Figure 2 in "Optical Fiber Communication Conference" 1992, San Jose 2-7, Optical Society of America, US, Washington DC 2006, pages 255-256, there is a description of an add-drop module having a plurality of conventional drop filters and add filters. A protection connection is set up in the usual way by feeding back the data.

Disclosed in Electronics Letters, GB, IEE Stevenage, Vol. 32, no. 3,1, February 1996, pages 234-235, "Increased Capacity in an MS Protection Ring Using WDM Technique and OADM: The Coloured Section Ring" is a protection method in which different wavelengths are used for individual link sections of a bidirectional ring network. A protection connection is made via a wavelength not used on the undisturbed sections.

Wavelength changes are required as a rule in order to reconfigure a ring network, that is to say to set up new logic connections. The aim with newly designed optical ring networks is for data to be dropped and inserted on the optical plane, and for reconfiguration to be a simple possibility. Moreover, it is also possible to implement the ring network including the add-drop modules (network nodes) as cost effectively as possible.

Such an add-drop module is specified in claim 1.

Advantageous developments of the add-drop module ring network are specified in the subclaims. A ring network implemented thereby is specified in claim 6.

A unidirectional ring network is particularly cost effective, since only one glass fiber is required for transmission, and the

network nodes can be of simple design. A unique assignment of transmission channels, and thus of the transmitted data signals to the network nodes is provided by the fixed assignment of a specific transmission channel or a wavelength, which is used only once in the ring network, to a network node. Since each network node receives the data signals of all other network nodes, the setting up of an arbitrary connection to other network nodes is possible by selecting an appropriate receiving filter. If a receiving filter which can be switched over or tuned is selected, any desired connections can be set up between all the network nodes. A plurality of filters also permits simultaneous connection to a plurality of network nodes.

A very simple design of an add-drop module or a network node results from the use of a coupler which is provided with a grating and thereby has filtering properties.

If higher demands are placed on the transmission integrity, it is possible to provide for backup circuits a second ring in which the data transmission is performed in the opposite direction.

Exemplary embodiments of the invention are explained in more detail with the aid of figures, in which:

Figure 1 shows an unidirectional ring network,
Figure 2 shows a obvious exemplary embodiment of a network node,
Figure 3 shows an exemplary embodiment according to the invention of this network node, and
Figure 4 shows a unidirectional ring network having a standby transmission ring.

A unidirectional ring network having a plurality of network nodes NA, NB, NC, ..., NN is illustrated in Figure 1. The transmission between arbitrary network nodes is performed using wavelength-division multiplex operation via a glass fiber 1 in a plurality of transmission channels

Λ_A to Λ_N, which have a prescribed wavelength spacing from one another. The transmission direction is marked by arrows.

The network node NA is illustrated as a block diagram in **Figure 2** in an obvious implementation. Network nodes serve the purpose of implementing different connections, which are always performed via transmission channels. Data signals to be output in the network node are denoted as drop signals (drop), those to be emitted being denoted as add data signals (add). Dropping, switching through or adding channels are also spoken of, the signals transmitted in these channels being intended, in the narrower sense. Reference symbols with identical indices are used for the transmission channels and the associated data signals. A data signal λ_A is transmitted in the associated transmission channel Λ_B.

The network node reduced to the essential functions of an add-drop module contains the series circuit of an amplifier 4, an output device 5 and a launching device 6. A wavelength-division multiplex signal of all the data signals λ_A - λ_N received via transmission channels Λ_A - Λ_N is present at the input 2. A single signal can be transmitted in each transmission channel (transmission band), or else a plurality of individual signals can be transmitted using wavelength-division multiplex operation or, of course, also using time-division multiplex operation.

The received signals are firstly amplified and then passed to the output device 5. There, all the data signals/transmission channels are firstly split up into two signal paths in a 1:2 coupler (branching device). All the transmission signals/transmission channels to be switched through, except for the transmission

channel Λ_A assigned to this network node, are switched through via a signal path; a transmission channel Λ_{DROP}

or the data signal λ_{DROP} thereof, for example the data signal $\lambda_{B,DROP}$, is output via the other signal path.

The transmission channel Λ_{DROP} to be dropped is selected by the output device, designed here as a wavelength filter. The wavelength filter is illustrated here schematically as a coupler 51 with a fixed bandpass filter 52, which can be switched over or tuned, and a bandstop filter 53. The channel λ_{DROP} is the only one in the passband of the bandpass filter 52. It is relayed to a user terminal, for example, via a drop output 7.

Instead of the dropped data signal/channel, an appropriate data signal $\lambda_{A,ADD}$ present at the add input 8 in the assigned transmission channel is added in this network node in the launching device 6, designed as coupler. This presupposes that the signal λ_A (loop return signal) already emitted from the network node A and received again via the ring at the input 2 must be blocked at the latest upstream of the launching device 6. Provided for this purpose is the bandstop filter 53, which is situated in the first signal path and permanently tuned to the corresponding wavelength. The transmission of this signal can certainly also already be interrupted in the preceding network node MN, but this entails an additional outlay on configuration given additional further network nodes.

A wavelength-division multiplex signal containing the signals of all the transmission channels $\lambda_{A,ADD}$ and λ_B to λ_N is emitted at the output 3.

Each network node can receive the corresponding transmitted signal of each other network node, that is to say an appropriate connection can be set up, in each case by exchanging, switching over or tuning the band

pass filter 52. It is thereby possible to change the configuration in a simple way.

A network node according to the invention is illustrated in Figure 3. In this exemplary embodiment, a tunable bandpass filter 54 provided, and a coupler 61 provided with a grating 62 serves as launching device 61, 62. The wavelength-division multiplex signal coming from the amplifier 4 also contains the data signal λ_A, which has already transversed the entire ring network (loop return signal). The latter is reflected by the grating 62, which acts as a bandstop filter, and destroyed in an optical sink 63 (a suitable optical fiber termination). The signal $\lambda_{A,ADD}$ initially fed into the coupler contrary to the direction of transmission of the ring network is likewise reflected by the grating and thereby sent onwards in the transmission direction. Various structures are known for the coupler 61 provided with the grating. Either the grating is arranged in the coupling region (Figure 3), or two coupling regions are implemented between which separate gratings are respectively provided for each fiber.

Of course, it is also possible to implement connections to a plurality of channels between the individual network nodes. The add-drop modules illustrated in Figures 2 and 3 can be connected in series or appropriately adapted for this purpose. The joint outputting and launching of a plurality of adjacent channels is also possible for the use of wider filters.

Figure 4 shows an expanded ring network in which the optical fiber 1 is supplemented by an optical fiber 1P provided for protection purposes. In the event of a breakage or some other disturbance affecting the optical fiber 1, the data signals - only the protection data signal λ_{AP} being illustrated - are firstly transmitted via the undisturbed portion of the ring network and then fed in the opposite direction into the

protection optical fiber 1P, so that all the network nodes receive the data signal. The selection of the transmission path is performed by changeover switches provided in the network nodes.

Patent claims

1. An add-drop arrangement (51, 54, 61) for a unidirectional optical ring network for launching and outputting optical signals, having a grating filter (62), designed as a bandstop filter, for an optical ring network for outputting optical signals (λ_B - λ_N), characterized in that the first coupler (51) has one input, to which the incoming signals (λ_B - λ_N) are fed, and two outputs, in that the first output is connected to a second optical coupler (61), which is designed as grating filter (62) with bandstop properties, the grating filter (62) being tuned to the wavelength of a signal ($\lambda_{A,ADD}$) to be launched, such that this signal is reflected, and incoming signals (λ_B - λ_N) having all other wavelengths are passed at and output at an output (3), in that the second coupler (61) has an add input (8) into which the signal ($\lambda_{A,ADD}$) to be launched is fed against its transmission direction, reflected and added to the passed signals (λ_B - λ_N), and in that a second output of the first coupler (51) is connected to a further optical filter (52, 54) via which an incoming optical signal (Λ_{DROP}; $\Lambda_{B,DROP}$) is output.

2. The add-drop arrangement as claimed in claim 1, characterized in that the further optical filter (52, 54) of the add-drop arrangement (51, 54, 61) is designed in such a way that different transmission channels (Λ_{DROP}; $\Lambda_{B,DROP}$) are output.

3. The add-drop arrangement as claimed in claim 2, characterized in that

the add-drop arrangement (51, 54, 61) has further filters (52) which can be exchanged or switched over, and has exchangeable second couplers (61) with grating filters (62) tuned to other wavelengths.

4. The optical ring network as claimed in claim 3, characterized in that the add-drop arrangement (51, 54, 61) has exchangeable second couplers (61) which are tuned to other wavelengths.

5. The optical ring network as claimed in claim 2, characterized in that the second coupler (61) has a further connection via which the reflected signals are led to an optical sink (63).

6. An optical unidirectional ring network having a plurality of network nodes (NA - NN), in which data signals (λ_A, λ_B, ...λ_N) are transmitted in wavelength-division multiplex operation via an optical fiber (1) and every network node (NA - NN) is assigned for its data signal ($\lambda_{A,ADD}$) to be emitted an assigned transmission channel (Λ_A) with a transmission band used only once, characterized in that at least one network node (NA - NN) has an add-drop arrangement (51, 54, 61) as claimed in one of the preceding claims.

7. The optical ring network as claimed in claim 6, characterized in that a further fiber (P1) is provided for protection purposes.

FIG 1

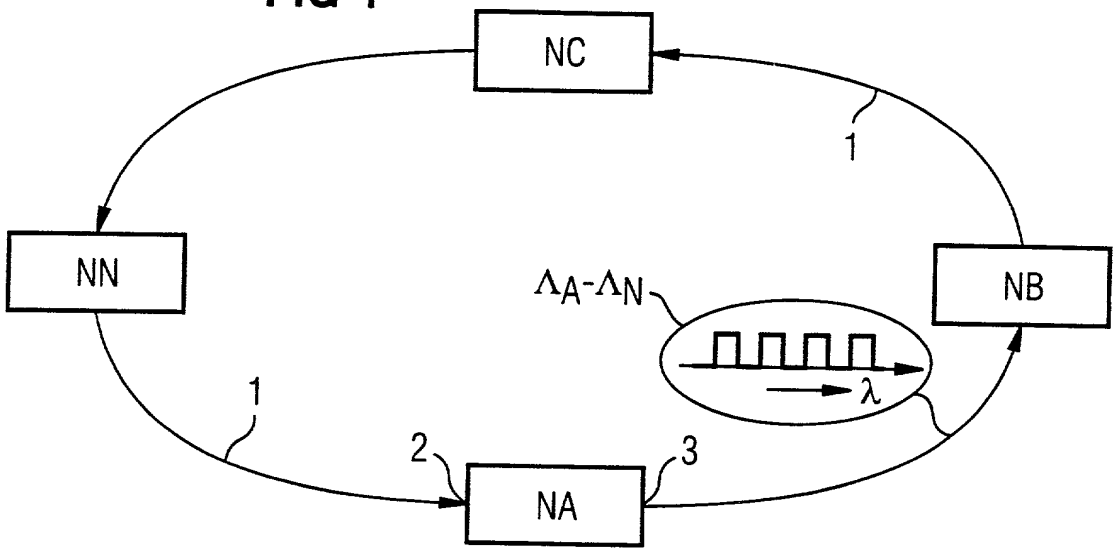

NC
1
NN
ΛA-ΛN
NB
λ
1
2
3
NA

FIG 2

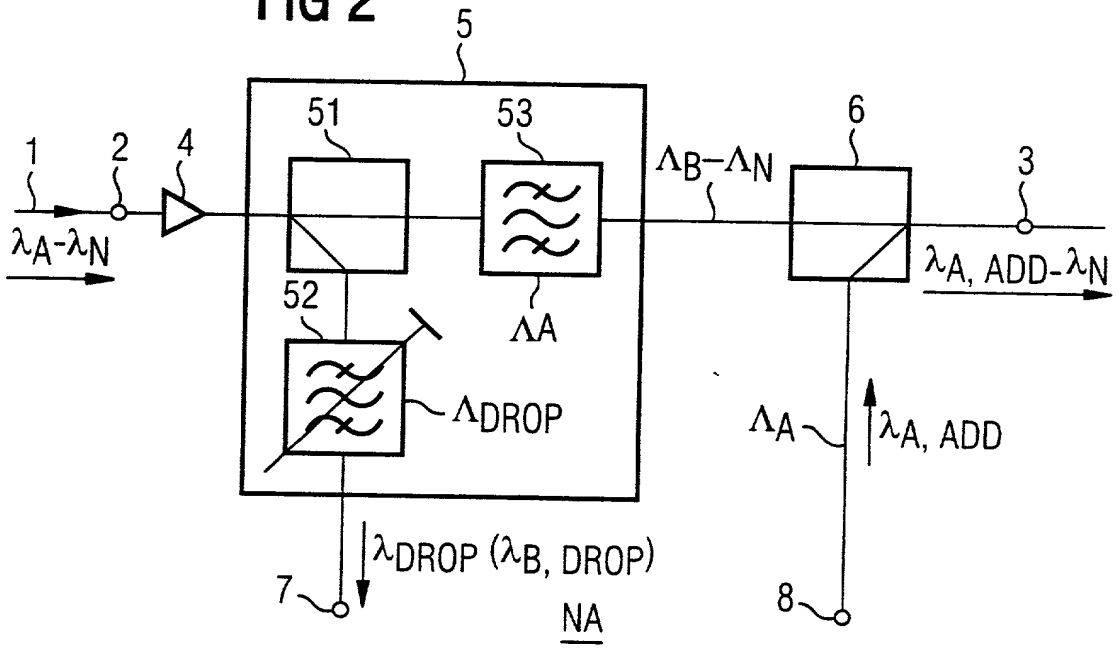

5
51
53
6
1
2
4
ΛB–ΛN
3
λA-λN
λA, ADD-λN
52
ΛA
ΛDROP
ΛA
λA, ADD
λDROP (λB, DROP)
7
8
NA

FIG 3

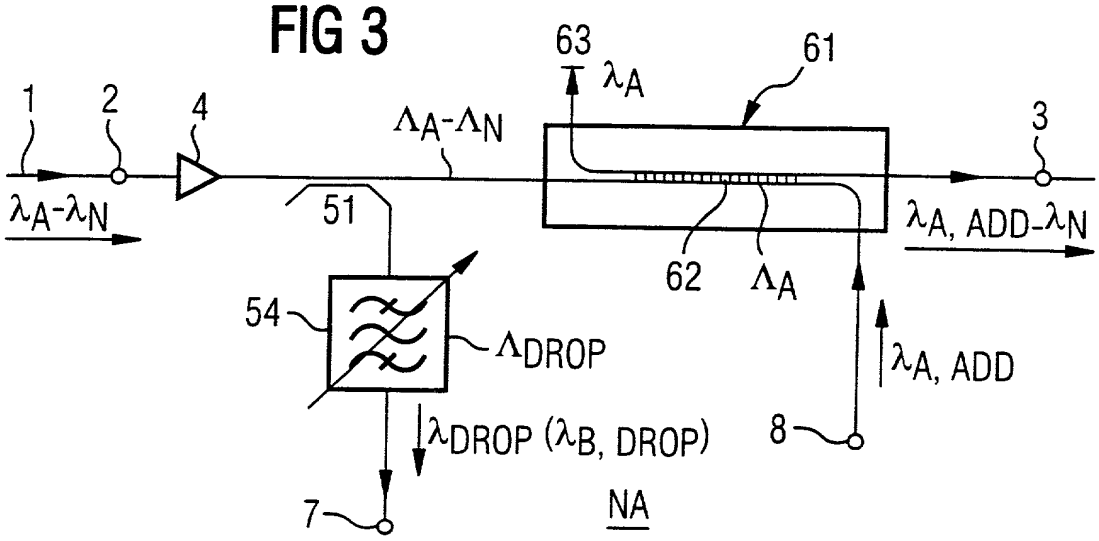
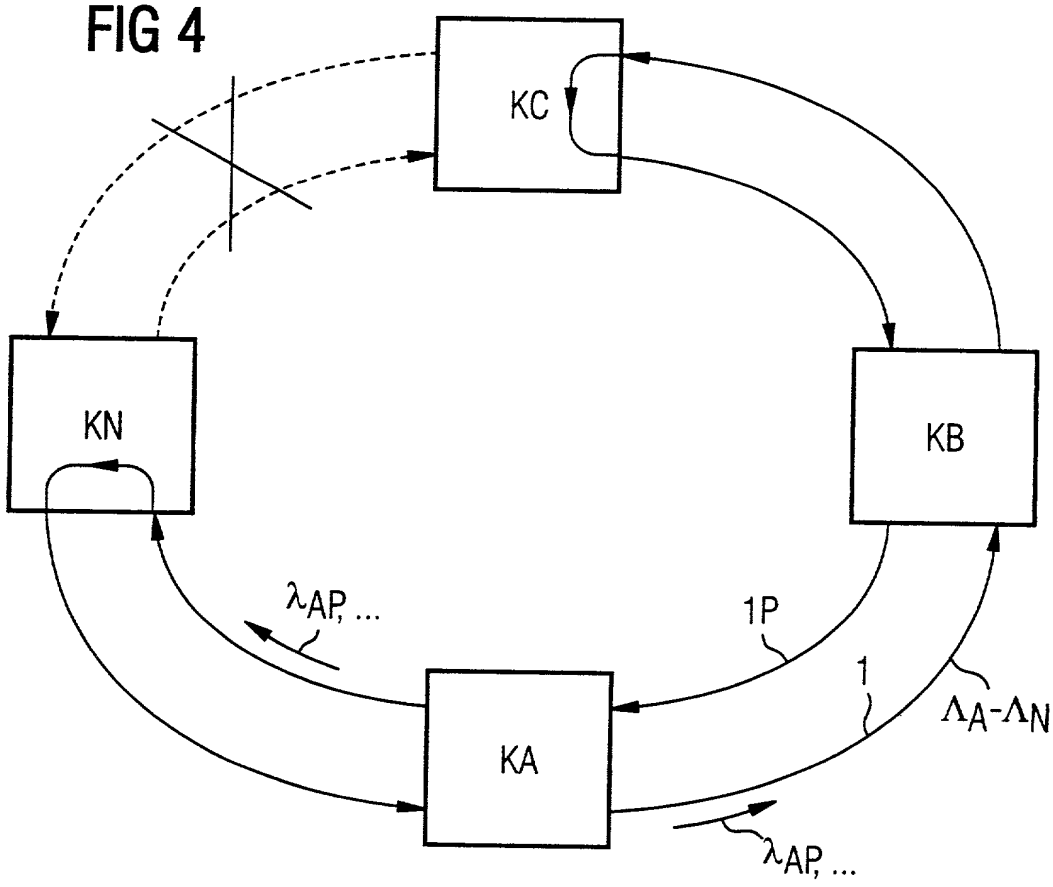

63
λ_A
61
1
2
4
Λ_A-Λ_N
3
λ_A-λ_N
51
λ_A, ADD-λ_N
62
Λ_A
54
Λ_{DROP}
λ_A, ADD
λ_{DROP} (λ_B, DROP)
8
7
NA

FIG 4


KC
KN
KB
λ_{AP}, ...
1P
1
Λ_A-Λ_N
KA
λ_{AP}, ...

Declaration and Power of Attorney For Patent Application
Erklärung Für Patentanmeldungen Mit Vollmacht
German Language Declaration

Als nachstehend benannter Erfinder erkläre ich hiermit an Eides Statt:

As a below named inventor, I hereby declare that:

dass mein Wohnsitz, meine Postanschrift, und meine Staatsangehörigkeit den im Nachstehenden nach meinem Namen aufgeführten Angaben entsprechen,

My residence, post office address and citizenship are as stated below next to my name,

dass ich, nach bestem Wissen der ursprüngliche, erste und alleinige Erfinder (falls nachstehend nur ein Name angegeben ist) oder ein ursprünglicher, erster und Miterfinder (falls nachstehend mehrere Namen aufgeführt sind) des Gegenstandes bin, für den dieser Antrag gestellt wird und für den ein Patent beantragt wird für die Erfindung mit dem Titel:

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

Optisches unidirektionales Ringnetz

Optical unidirectional ring network

deren Beschreibung

(zutreffendes ankreuzen)
☐ hier beigefügt ist.
☒ am 14.10.1999 als
PCT internationale Anmeldung
PCT Anmeldungsnummer PCT/DE99/03303
eingereicht wurde und am _____
abgeändert wurde (falls tatsächlich abgeändert).

the specification of which

(check one)
☐ is attached hereto.
☒ was filed on 14.10.1999 as
PCT international application
PCT Application No. PCT/DE99/03303
and was amended on _____
(if applicable)

Ich bestätige hiermit, dass ich den Inhalt der obigen Patentanmeldung einschliesslich der Ansprüche durchgesehen und verstanden habe, die eventuell durch einen Zusatzantrag wie oben erwähnt abgeändert wurde.

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims as amended by any amendment referred to above.

Ich erkenne meine Pflicht zur Offenbarung irgendwelcher Informationen, die für die Prüfung der vorliegenden Anmeldung in Einklang mit Absatz 37, Bundesgesetzbuch, Paragraph 1.56(a) von Wichtigkeit sind, an.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, §1.56(a).

Ich beanspruche hiermit ausländische Prioritätsvorteile gemäss Abschnitt 35 der Zivilprozessordnung der Vereinigten Staaten, Paragraph 119 aller unten angegebenen Auslandsanmeldungen für ein Patent oder eine Erfindersurkunde, und habe auch alle Auslandsanmeldungen für ein Patent oder eine Erfindersurkunde nachstehend gekennzeichnet, die ein Anmeldedatum haben, das vor dem Anmeldedatum der Anmeldung liegt, für die Priorität beansprucht wird.

I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

German Language Declaration

Prior foreign appplications
Priorität beansprucht

			Priority Claimed	
19847410.5	DE	14.10.1998	☒	☐
(Number) (Nummer)	(Country) (Land)	(Day Month Year Filed) (Tag Monat Jahr eingereicht)	Yes Ja	No Nein
			☐	☐
(Number) (Nummer)	(Country) (Land)	(Day Month Year Filed) (Tag Monat Jahr eingereicht)	Yes Ja	No Nein
			☐	☐
(Number) (Nummer)	(Country) (Land)	(Day Month Year Filed) (Tag Monat Jahr eingereicht)	Yes Ja	No Nein

Ich beanspruche hiermit gemäss Absatz 35 der Zivilprozessordnung der Vereinigten Staaten, Paragraph 120, den Vorzug aller unten aufgeführten Anmeldungen und falls der Gegenstand aus jedem Anspruch dieser Anmeldung nicht in einer früheren amerikanischen Patentanmeldung laut dem ersten Paragraphen des Absatzes 35 der Zivilprozeßordnung der Vereinigten Staaten, Paragraph 122 offenbart ist, erkenne ich gemäss Absatz 37, Bundesgesetzbuch, Paragraph 1.56(a) meine Pflicht zur Offenbarung von Informationen an, die zwischen dem Anmeldedatum der früheren Anmeldung und dem nationalen oder PCT internationalen Anmeldedatum dieser Anmeldung bekannt geworden sind.

I hereby claim the benefit under Title 35. United States Code. §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §122, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occured between the filing date of the prior application and the national or PCT international filing date of this application.

PCT/DE99/03303 (Application Serial No.) (Anmeldeseriennummer)	14.10.1999 (Filing Date D, M, Y) (Anmeldedatum T, M, J)	_____ (Status) (patentiert, anhangig, aufgegeben)	(Status) (patented, pending, abandoned)
_____ (Application Serial No.) (Anmeldeseriennummer)	(Filing Date D,M,Y) (Anmeldedatum T, M; J)	_____ (Status) (patentiert, anhängig, aufgeben)	(Status) (patented, pending, abandoned)

Ich erkläre hiermit, dass alle von mir in der vorliegenden Erklärung gemachten Angaben nach meinem besten Wissen und Gewissen der vollen Wahrheit entsprechen, und dass ich diese eidesstattliche Erklärung in Kenntnis dessen abgebe, dass wissentlich und vorsätzlich falsche Angaben gemäss Paragraph 1001, Absatz 18 der Zivilprozessordnung der Vereinigten Staaten von Amerika mit Geldstrafe belegt und/oder Gefängnis bestraft werden koennen, und dass derartig wissentlich und vorsätzlich falsche Angaben die Gültigkeit der vorliegenden Patentanmeldung oder eines darauf erteilten Patentes gefährden können.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true, and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

German Language Declaration

VERTRETUNGSVOLLMACHT: Als benannter Erfinder beauftrage ich hiermit den nachstehend benannten Patentanwalt (oder die nachstehend benannten Patentanwälte) und/oder Patent-Agenten mit der Verfolgung der vorliegenden Patentanmeldung sowie mit der Abwicklung aller damit verbundenen Geschäfte vor dem Patent- und Warenzeichenamt: *(Name und Registrationsnummer anführen)*

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith. *(list name and registration number)*

And I hereby appoint

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